this application illustrate examples of vibration motor assemblies, molding methods and use of such assemblies in devices, as well as other components and aspects of this invention.

[0038] Referring now to the figures, FIGS. **1-6** show, as an example embodiment, a vibration motor assembly **10**, which vibration motor assembly **10** includes a vibration motor **20** having a shaft **21**, an eccentric mass **22** attached to the shaft **21**, a capsule **40**, and an end cap **50**. The capsule **40** and the end cap **50**, as assembled, enclose the vibration motor **20**, the shaft **21** and the mass **22**.

[0039] As shown in FIGS. **1-6**, an example vibration motor **20** includes the shaft **21**, one or more magnets **23**, one or more wire windings **24**, and a motor casing **30**. The shaft **21** is at least partially received within the motor casing **30** and extends through the motor casing **30**, and has a proximal portion **25** that extends from a first or proximal end **31** of the motor casing **30**, a distal portion **26** that extends from a second or distal end **32** of the motor casing **30**, and a middle portion **27** that is positioned within the motor casing **30**. In this configuration, the shaft **21** can rotate about an axis of rotation R. In example embodiments, the shaft **21** has a plurality of arms **28** that extend from the middle portion **27**. The shaft **21** in FIGS. **1-6** includes three arms **28**, the arms having spacing of approximately 120° around the shaft **21**. In other example vibration motors **20**, the shaft **21** may include a different number of arms **28**, or may not include arms **28**. Each of the arms **28** has a base **28***a* and a rounded flange **28***b* spaced from the axis R of the shaft **21**, and each of the arms **28** has a wire winding **24** wound around the base **28***a*. The shaft **21** further has a commutator **29** at the proximal portion **25** that is electrically connected to the wire windings **24**, and which is described in greater detail below. Generally, the shaft **21** is made of a metallic material, although other materials can be used. In example embodiments wherein a commutator **29** is used, at least the commutator **29** may be formed of a conductive material. It is understood that the arms **28** may be formed integrally with the shaft **21** or may be implemented as one or more separate pieces connected to the shaft **21**. It is understood that the arms **28** may be formed of other than a metallic material, including as an example a polymer material (e.g., a material having lesser conductivity than a metallic material). The shaft **21** may also have a cap **39** near the distal end **32** of the motor casing **30**, which may have a flange **39***a* to help keep the windings in place and/or stabilize the rotation of the shaft **21**.

[0040] The motor casing **30** has an internal cavity **33** that encloses various components of the vibration motor **20**, including the magnet(s) **23**, the wire winding(s) **24**, and the middle portion **27** of the shaft **21** in example embodiments as illustrated in FIGS. **1-6**. The distal end **32** of the motor casing **23** has an opening **34** that allows the shaft **21** to pass out of the casing **23**. The proximal end **31** of the motor casing **23** in example embodiments is fully open and includes an opening **35** that allows the shaft **21** to pass through and also is configured for connection with the end cap **50** as described below. The motor casing **30** shown in FIGS. **1-6** has a beveled cylindrical shape, with two opposed flat sides **36** and two opposed rounded sides **37**, and the opening **35** at the proximal end **31** has a similar peripheral shape.

[0041] The vibration motor **20**, as shown in the example of FIGS. **1-6**, includes two separate magnets **23** located on opposite sides of the cavity **33** of the motor casing **30**. As seen in FIG. **4**, the magnets **23** are positioned adjacent the two rounded sides **37** of the motor casing **30**. The two magnets **23** serve as opposite magnetic poles. In other example embodiments, the motor **20** may include more than two magnets **23**, or may include a single magnet **23**. Additionally, the vibration motor **20** in FIGS. **1-6** includes windings **24** that are wound around the arms **28** of the shaft **21**. In example embodiments, all of the windings **24** are formed of a single wire that is connected to the commutator **29** of the shaft **21**. As described herein, the windings **24** receive power through to electrical connection with the commutator **29** such that, when power is supplied to the windings **24**, the interaction between the inductive effect of the windings **24** and the magnetic field of the magnets **23** causes rotation of the shaft **21**. In some example embodiments, the motor **20** may include a different number of windings **24** and/or each winding may be formed of a separate wire.

[0042] It is understood that other embodiments and/or configurations of vibration motors exist, including other configurations of in-line vibration motors, and such other configurations may be used in connection with various example embodiments of a vibration motor assembly **10** in accordance with description herein. As an example, in some embodiments and/or configurations of vibration motors, the motor casing **30** may have a different shape (such as, e.g., by not including either or both flattened sides **36**), and/or the magnet(s) **23** and/or the winding(s) **24** may be differently numbered, configured or otherwise provided, including, e.g., being located in different positions. As an example, in some embodiments and/or configurations of vibration motors, one or more components described herein may be omitted, such as, for example, the vibration motor **20** may not include a motor casing **30**.

[0043] In example embodiments, such as shown in FIGS. **1-6**, the capsule **40** has, substantially along its length, a circular-cylindrical external shape. Such example capsule **40** has an open end **41** and has, opposite to the open end **41**, a closed end **42**. The open end **41** is configured to provide for connection of the capsule **40** with the end cap **50**. The closed end **42** of this example capsule has a dome-like configuration. In other example capsules, the closed end **42** may have other configuration, including, as examples, a hemispherical configuration, a semi-spherical configuration, or a configuration of, or substantially of, another selected section of a sphere. In still other example capsules, the closed end **42** may retain, or substantially retain, the cylindrical shape otherwise provided along the capsule's length, e.g., such that the capsule's closed end **42** may have a substantially planar configuration which configuration, in cross-section, describes (i) a circle or substantial circle (e.g., if such closed end is not perpendicular, or substantially perpendicular, to the capsule's length), (ii) an elliptic shape (e.g., if such closed end is substantially not perpendicular) or (iii) some other curved shape responsive to the closed end's orientation as referenced to the longitude of the capsule and to the capsule's external shape. It is also understood that, generally along its length, the capsule **40** may have alternative or additional external shape(s), including, e.g., as examples, elliptical-cylindrical, generalized-cylindrical (i.e., the cross-section may be any curve or curves), rectangular cuboidic (e.g., shaped like a rectangular box) or, generally, polygonal prismatic (e.g., along its longitude, being shaped substan-